CHAPTER I
INTRODUCTION

A. Background

Concrete is the most important thing in a construction. Almost every aspect of development cannot be separated from a concrete. As an example of a construction work on roads, buildings, bridges and other construction work, almost all of these work structures or other works are of course made of concrete, so it can be concluded that all structural work or other construction work cannot be separated from the presence of a concrete. Concrete is a composite material comprising coarse and fine aggregates mixed with water and cement as a binder and filler between coarse and fine aggregates, sometimes added additive or admixture when necessary (Subakti, 1995).

The development of concrete technology that increases over time and the number of concrete users in the field of construction make an effort to create a good and economical concrete quality. One attempt to increase the tensile strength of concrete is by using special gradations on coarse aggregates (gravel).

Coarse aggregate (gravel) is a concrete material that has high strength and contributes the greatest volume in the concrete composition. This composition should be a coarse aggregate (gravel) capable of contributing optimally to the concrete. Gradation specifically in coarse aggregate (gravel) is a gradation with a certain size range so that the future of concrete can serve as a concrete intact and solid, in which the coarse aggregate (gravel) with grains smaller to fill the gap that exists between the coarse aggregate (gravel) with grain greater than.

Therefore, the authors conclude to use a coarse aggregate material (gravel) as the material to be made of special gradation. The existence of this special graded research concrete, it is hoped that the possibility to design a structural element with a higher value of compressive strength.

B. Formulation of The Problem

Based on the background explanation of the research, it can be formulated some problems as follows:

1. What is the ratio of compressive strength of aggregate concrete to specific graded with conventional graded concrete compressive strength?
2. What is the correlation between the coarse aggregate (gravel) compositions to the strength of the concrete?

C. Purposes of Research

The purposes of research in this study are as follows:

1. To find out the result of compressive strength ratio of granular aggregate concrete (gravel) with a special graded with conventional graded concrete compressive strength.
2. To know the correlation between the aggregate composition (gravel) to the strength of the concrete.

D. Benefits of Research

The benefits of this research include the following:

1. Know the correlation between the aggregate compositions (gravel) to the strength of the concrete.
2. Know the shortcomings and excesses of special graded concrete on coarse aggregates (gravel).
3. Providing benefits in the world of education and knowledge in the field of civil engineering especially regarding special graded concrete.

E. Limitation of Research

This research in order to be focused and in accordance with the purpose of the study then given the boundaries of the problem include:

1. The research was conducted at the Civil Engineering Laboratory of Muhammadiyah University of Surakarta.
2. Fresh concrete tests include:
   a) Slump Test
3. Hard concrete tests include:
   a) Compressive Strength Test
4. Test objects used in this study include:
   a) Testing the compressive strength of the cylinder with a diameter of 15 cm and 30 cm in height.
5. Cement used is Portland cement with brand Holcim.
6. Water used from the Laboratory of Civil Engineering University of Muhammadiyah Surakarta.
7. Fine aggregate (sand) used is sand originating from Mount Merapi.
8. Coarse aggregates (gravel) used are gravels with a maximum gradation size of 20 mm from Mount Merapi.
9. The quality of concrete (f'c) planned in this study is 22 MPa.
10. The compressive strength test was performed at 7, 14, 21, and 28 days concrete.
11. Using the value of water cement ratio (fas) of 0,40.
12. Method of design of concrete mixture in this research using ACI method.
13. The total cylindrical test objects in this research were 36.